

ABSTRACT

A combustion catalyst coating (36) applied to the surface of a ceramic thermal barrier coating (34) which is supported by a metal substrate (32). The columnar-grained microstructure of the thermal barrier coating surface provides the necessary surface area for interaction of the catalyst and a fuel-air mixture in a catalytic combustor of a gas turbine engine. The temperature gradient developed across the thermal barrier coating protects the underlying metal substrate from a high temperature combustion process occurring at the catalyst surface. The thermal barrier coating deposition process may be controlled to form a columnar grained microstructure having a plurality of primary columns each with a plurality of secondary and tertiary branches in order to achieve a desired specific surface area for receiving the catalyst coating.